UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

G

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/492,029	01/26/00	ZUKER	C 2307E-92710U

000909
PILLSBURY WINTHROP LLP
1600 TYSONS BOULEVARD
MCLEAN VA 22102

HM12/1002

EXAMINER	
RAO, M	
ART UNIT	PAPER NUMBER
1652	13

DATE MAILED: 10/02/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

1- File Copy

PTO-90C (Rev.11/00)

Office Action Summary	Application No. 09/492,029	Applicant(s) ZUKER ET AL.	
	Examiner Manjunath N Rao	Art Unit 1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 June 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5,6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims 1-20 are currently pending in this application.

Priority

2. Applicant's claim for domestic priority under 35 U.S.C. 119(e) is acknowledged.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 3 recites the phrase "functional effect is a chemical effect". It is not clear to the Examiner either from the specification or from the claim as to what applicants mean by a functional effect being a chemical effect.

5. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 4 recites the phrase "functional effect is a physical effect". It is not clear to the Examiner either from the specification or from the claim as to what applicants mean by a functional effect being a physical effect.

6. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 20 recites the phrase "promiscuous G-protein". It is not clear to the Examiner either from the specification or from the claim as to what applicants mean by a promiscuous G-protein.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Margolskee et al. (WO 93/21337, 10-28-1993) in view of Levine et al. (Proc. Natl. Acad. Sci. USA, 1990, Vol. 87:2329-2333) or Ray et al. (Gene, 1994, Vol. 149:337-340). Claims 1-19 in this instant application are basically drawn to a method of identifying a compound that modulates sensory signaling in sensory cells comprising contacting a compound with a sensory cell specific G-protein β polypeptide which is greater than 70% amino acid sequence identity to SEQ ID NO:3 or 5 and determining the functional effect of the compound upon the polypeptide. The functional effect is determined by either measuring change in intracellular concentration of specific cyclic nucleotides or Ca2+ and wherein the polypeptide is expressed in a cell or a cell membrane. The claims are also directed to methods wherein the functional effect is determined by changes in electrical activity measured by voltage clamp assay or a patch clamp assay etc. and wherein the functional effect is determined by measuring changes in transcription levels of taste cell specific genes and wherein the polypeptides are recombinant or covalently linked to a solid phase support and wherein the polypeptide is from mouse, rat or human or has an amino acid sequence of SEQ ID NO:3 or 5.

Margolskee et al. teach in detail regarding the mechanisms involved vertebrate taste transduction. The reference also teaches that guanine nucleotide binding proteins (G proteins) are heterotrimeric proteins (each having an α , β, and γ sub unit) which mediate signal transduction in olfactory, visual, hormonal and neurotransmitter systems. The reference teaches G proteins are specifically involved in taste transduction. The reference teaches that G proteins couple cell surface receptors to cellular effector enzymes (i.e., phosphodiesterases and adenylate cyclases) and thereby transduce extracellular signals into intracellular second messenger (e.g., cAMP, cGMP, IP3 etc.). The reference also teaches that while α subunit of G protein confers

most of the specificity of interaction between its receptor and its effectors in signal transduction process, β and γ subunits appears to be shared among different G proteins. There are several publications which suggest that G-proteins mediate signal transduction pathway. Thus it appears that it was well known in the art that cyclic nucleotides such as cAMP, cGMP along with G proteins are very much involved in the transduction of taste. The above reference also reveals the involvement of Ca2+ in transduction of taste and involvement of G-proteins. The reference also suggests that compounds with taste lead to taste cell depolarization via a G protein mediated rise in cAMP. For example, bitter compounds lead to Ca2+ release from internal stores which is a result of G- protein mediated generation of IP3.

The reference also teaches that over the past decade, efforts have been directed to the development of various agents that interact with taste receptors or mimic or block natural taste stimulants. However, some such taste mimetics have been known not to be suitable for humans either because of high calories they carry or because they are potent carcinogens. Therefore development of new agents that mimic taste or block taste have been limited due to the lack of knowledge of the taste cell proteins responsible for transducing taste modalities and thus there continues to exist a need in the art for new products and methods that are involved in or affect taste transduction. Furthermore, the above reference provides the DNA encoding α subunit called as gustducin of the G-protein involved in taste transduction. The reference also provides methods to identify taste modifying agents which involves identifying agents capable of modulating (mimicing or inhibiting) the interaction of gustducin. Out of the several methods Margolskee et al. propose one of the method taught is the method of identifying a compound which modulates the activity of the α subunit of the sensory cell associated G-protein by contacting the compound with the α polypeptide only or with α , β and γ polypeptides associated in biologically active form and a radioactively labeled GTP followed by the determination of the rate of conversion of GTP to GDP, which is very similar to the method proposed in the instant for the β polypeptide. However, the reference does not teach an assay using only β polypeptide or a polypeptide which has an amino acid sequence with SEQ ID NO:3 or 5 or any polypeptide which is 70% identical to SEQ ID NO:3 or 5. The reference is also silent on certain other types of assays such as the use of patch clamp technique or radiolabeled ion flux assay etc.

However, Examiner takes the position that such techniques have become routine in the art and are well known for studying signal transduction in various types of cells.

Ray et al. teach the cloning of the β polypeptide of sensory cell G-protein which has 100% identity to SEQ ID NO:3. The reference provides cDNA techniques and methods to make recombinant β polypeptide.

Levine et al. teach the cloning of the β polypeptide of sensory cell G-protein which has 97% identity to SEQ ID NO:5. The reference provides cDNA techniques and methods to make recombinant β polypeptide.

Thus it appears that it was well known in the art that there was a concerted effort in the art for identifying compounds which modulate the activity of sensory cell G-protein. It also appears that a method for assaying compounds which modulate the α polypeptide of sensory cell G-protein was also well known in the art. Based on the above knowledge and with the knowledge that the sensory cell G-protein comprises of α, β, and γ polypeptides, it would have been obvious to one of ordinary skill in the art to identify agents that specifically modulate the activity of either β or as a matter of fact even γ polypeptide. As Margolskee et al. teach, one would be motivated to do this in order to identify agents which mimic or block taste which have commercial importance in food and pharmaceutical industry and also due to the fact that some of the known agents are unsuitable for human consumption. One would have a reasonable expectation of success since Margolskee et al. have already laid the foundation for such methods and also isolated compounds which modulate one of the other factors of sensory cell G-protein, the α polypeptide and Levine et al. and Ray et al. provide cDNA clones for the β polypeptide of sensory cell G-protein.

Therefore the claimed invention would have been *prima facie* obvious to one of ordinary skill in the art.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Manjunath Rao whose telephone number is (703) 306-5681. The Examiner can normally be reached on M-F from 6:30 a.m. to 3:00 p.m. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, P.Achutamurthy, can be reached on (703) 308-3804. The fax number for Official Papers to Technology Center 1600 is (703) 305-3014. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

PONNATHAPU ACHUTAMURTHY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600

Manjunath N. Rao Ph.D.
09/28/01